REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
01-07-2010	FINAL	Sep 2008 - Dec 2009

4. TITLE AND SUBTITLE
Publication Support for AOSN-II Special Issue

5a. CONTRACT NUMBER
N/A

5b. GRANT NUMBER
N00014-08-1-1267

5c. PROGRAM ELEMENT NUMBER
N/A

6. AUTHOR(S)
David M. Fratantoni

5d. PROJECT NUMBER
WHOI

5e. TASK NUMBER
N/A

5f. WORK UNIT NUMBER
N/A

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Woods Hole Oceanographic Institution
MS #30
Woods Hole, MA 02543

8. PERFORMING ORGANIZATION REPORT NUMBER
FINAL

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
UNLIMITED / UNCLASSIFIED

13. SUPPLEMENTARY NOTES

14. ABSTRACT

See attached Final Report.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			David M. Fratantoni
Unlimited/ Unclassified	Unlimited/ Unclassified	Unlimited/ Unclassified	Unlimited/ Unclassified	Five	19b. TELEPHONE NUMBER *(include area code)* (508) 289-2908

Publication Support for AOSN-II Special Issue

David M. Fratantoni
Autonomous Systems Laboratory
Physical Oceanography Department
Woods Hole Oceanographic Institution
Woods Hole, MA 02543
Phone: (508) 289-2908 Fax: (508) 457-2181
Email: dfratantoni@whoi.edu

Award Number: N00014-08-1-1267
http://asl.whoi.edu

OBJECTIVES

The Autonomous Ocean Sampling Networks (AOSN) program is an ambitious and ongoing ONR effort to combine new robotic vehicles and sampling methodologies with advanced ocean models to improve our ability to observe and predict the physical and biological state of the ocean. The AOSN-II field program was performed in Monterey Bay from mid-July to early September 2003. More than 20 autonomous underwater vehicles and a variety of in-situ and remote instrument systems were used to observe the evolution of wind-forced coastal upwelling processes and their biological consequences. The AOSN-II program received a great deal of national and international attention, and the accomplishments of the AOSN-II team continue to impact the development of regional observing strategies and systems including the NSF OOI. This award enabled broad dissemination of results from the AOSN-II field experiment via a special volume of *Deep-Sea Research II.*

RESULTS

A special issue of *Deep-Sea Research II* was assembled that brings together the technological and scientific advances of AOSN-II in a single, rigorously peer-reviewed volume. We anticipate that this volume, containing 13 papers dealing with science, technology, and observing system design and execution, will be widely referenced. Through this program, ONR provided financial support to cover color publication charges, and the production and wide distribution of 100 copies of the special issue. The AOSN-II special volume of *Deep-Sea Research Part II* was published in February 2009 (Volume 56, Numbers 3-5).

PUBLICATIONS

The contents of the AOSN-II special volume are as follows:

(0) "Introduction to the Autonomous Ocean Sampling Network (AOSN-II) Program" by D.M. Fratantoni and S.H.D. Haddock.

(1) "Progress Toward Autonomous Ocean Sampling Networks" by Thomas B. Curtin and James G. Bellingham.

(2) "Preparing to Predict: The Second Autonomous Ocean Sampling Network (AOSN) Experiment in the Monterey Bay" by S. R. Ramp, R. E. Davis, N. E. Leonard, I. Shulman, Y. Chao, A. R. Robinson, J. Marsden, P. Lermusiaux, D. Fratantoni, J. D. Paduan, F. Chavez, F. L. Bahr, S. Liang, W. Leslie, and Z. Li.

(3) "High-Resolution Real-Time Modeling of the Marine Atmospheric Boundary Layer in Support of the AOSNII Field Campaign" by James D. Doyle, Qingfang Jiang, Yi Chao, and John Farrara.

(4) "Development, Implementation and Evaluation of a Data-Assimilative Ocean Forecasting System off the Central California Coast" by Yi Chao, Zhijin Li, John Farrara, James C. McWilliams, James Bellingham, Xavier Capet, Francisco Chavez, Jei-Kook Choi, Russ Davis, Jim Doyle, David M. Fratantoni, Peggy Li, Patrick Marchesiello, Mark A. Moline, Jeff Paduan, and Steve Ramp.

(5) "Forecasting and Reanalysis in the Monterey Bay / California Current Region for the Autonomous Ocean Sampling Network-II Experiment" by P. J. Haley, Jr., P. F. J. Lermusiaux, A. R. Robinson, W. G. Leslie, O. Logoutov, G. Cossarini, X. S. Liang, P. Moreno, S. R. Ramp, J. D. Doyle, J. Bellingham, F. Chavez, and S. Johnston.

(6) "Assimilation of HF radar-derived radials and total currents in the Monterey Bay area" by Igor Shulman and Jeffrey D. Paduan.

(7) "The correlation between surface drifters and coherent structures based on high-frequency radar data in Monterey Bay" by Shawn C. Shadden, Francois Lekien, Jeffrey D. Paduan, Francisco P. Chavez, and Jerrold E. Marsden.

(8) "Routing Strategies for Underwater Gliders" by Russ E. Davis, Naomi Leonard, and David M. Fratantoni.

(9) "Impact of Glider Data Assimilation on the Monterey Bay Model" by Igor Shulman, Clark Rowley, Stephanie Anderson, Sergio De Rada, John Kindle, Paul Martin, James Doyle, James Cummings, Steve Ramp, Francisco Chavez, David Fratantoni, and Russ Davis.

(10) "Methodology for a regional tidal model evaluation, with application to central California" by Leslie Rosenfeld, Igor Shulman, Michael Cook, Jeff Paduan, and Lev Shulman.

(11) "Modeling Tides in Monterey Bay, California" by Xiaochun Wang, Yi Chao, Changming Dong, John Farrara, Zhijin Li, James C. McWilliams, Jeffrey D. Paduan, and Leslie K. Rosenfeld.

(12) "Bioluminescence to Reveal Structure and Interaction of Coastal Planktonic Communities" by Mark A. Moline, Shelley M. Blackwell, James F. Case, Steven H. D. Haddock, Christen M. Herren, Cristina M. Orrico, and Eric Terrill.

(13) "Thin Phytoplankton Layer Formation at Eddies, Filaments, and Fronts in a Coastal Upwelling Zone" by T. M. Shaun Johnston, Olivia M. Cheriton, J. Timothy Pennington, and Francisco P. Chavez.

IMPACT/APPLICATIONS

The application of mobile autonomous sampling and prediction systems such as those developed during AOSN-II will improve understanding of spatially inhomogeneous, transient ocean phenomena such as planktonic thin layers, submesoscale eddies, and fronts as well as the broader physical environment in which they form and evolve. The integrated observation and prediction systems developed for AOSN-II will result in an enhanced capability for streamlined environmental assessment in remote or hostile locations and provide, in an efficient and cost-effective manner, high-quality, near-real-time environmental information for operational ocean/atmosphere forecasting and model validation. The special volume of DSR-II was distributed to AOSN-II PI's, ONR program management, and colleagues involved in planning and development of the next generation of ocean observing systems.

RELATED PROJECTS

The following is a list of known projects directly related to the AOSN-II field effort.

Implementing FORMS (Feature oriented regional modeling system) for the Monterey Bay forecasting system using HOPS and ROMS.
Avijit Gangopadhyay.
N00014-1-0206

Development of a Monterey Bay Forecasting System Using The Regional Ocean Modeling System (ROMS)
Yi Chao
N00014-03-1-0208

Adaptive sampling during AOSN-II
PI: S. J. Majumdar
N00014-03-1-0559

Deep Autonomous Gliders for the "Autonomous Ocean Sampling Network II' Experiment
Russ E. Davis, Jeffrey T. Sherman
N00014-03-1-1049

Coastal Bioluminescence: Measurement and Prediction
J.F. Case
N00014-97-1-0424
Grant Supplement, Mod. 13

Aerial Surveys of the Atmosphere and Ocean off Central California
N0001403WR20002
N0001403WR20006
S. R. Ramp, J. D. Paduan, W. Nuss, and C. A. Collins

Hyperspectral Radiometer for Airborne Deployment
N0001403WR20209
S. Ramp

High-Resolution Measurement of Coastal Bioluminescence: II. Improving short-term predictability across seasons
Steven Haddock
N00014-00-1-0842

QUANTIFICATION OF LITTORAL BIOLUMINESCENCE STRUCTURE AND INDUCED WATER LEAVING RADIANCE
Mark Moline
N00014-03-1-0341

Use of a Circulation Model to Enhance Predictability of Bioluminescence in the Coastal Ocean
Igor Shulman
Naval Research Laboratory, Grant Number: N00014-03-WX-20882 and -20819
Leslie Rosenfeld and Jeffrey Paduan
NPS, Grant Number: N00014-03-WR-20009
Dennis McGillicuddy
N000140210853

Participation in AOSN II
A. Healey
N0001403WR20063

Autonomous Ocean Sampling Network II (AOSN II): System Engineering and Project Coordination
J. G. Bellingham and P. Chandler
N00014-02-1-0856

Underwater Glider Networks and Adaptive Ocean Sampling
Naomi Leonard, Clarence Rowley, and Jerrold Marsden
N000140210826

Underwater Glider Dynamics and Control
Leonard (PI)
N00014-02-1-0861

Autonomous Ocean Sampling Network II: Assessing the Large Scale Hydrography of the Central California Coast
Margaret A. McManus and Francisco Chavez
N000140310267

An Autonomous Glider Network for the Monterey Bay Predictive Skill Experiment / AOSN-II
David M. Fratantoni
N000140210846

Development of a Regional Coastal and Open Ocean Forecast System:
Harvard Ocean Prediction System (HOPS)
(Included under this are "Quantitative Interdisciplinary Adaptive Sampling OSSEs for Monterey Bay and the California Current System - AOSN-II" and "Adaptive Sampling OSSEs for Monterey Bay and the California Current System - AOSN-II")
A.R. Robinson
N00014-97-1-0239